Name: Date:

Exam: Function Reflections (Solution version 35)

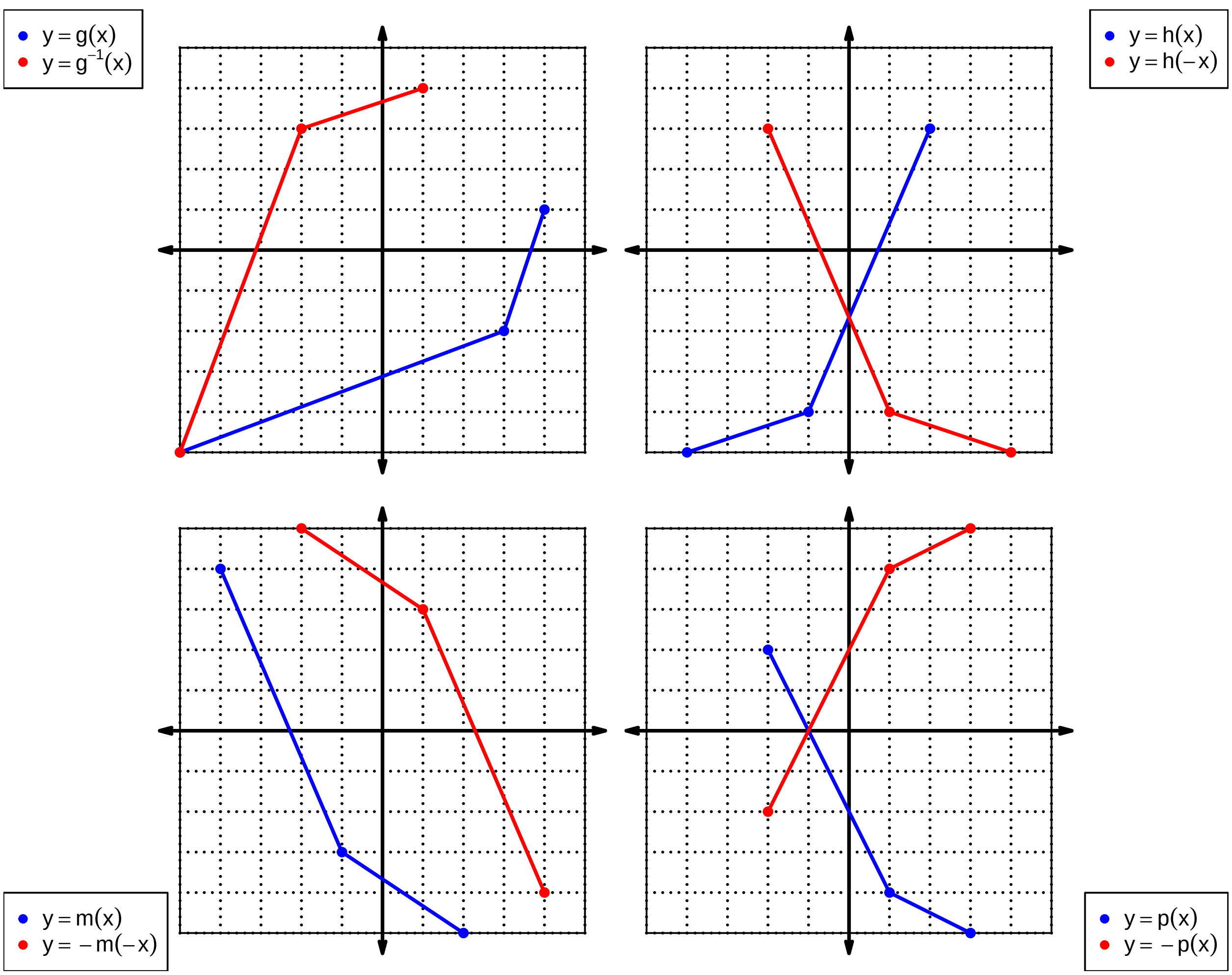
1. Let function f be defined by the polynomial below:

$$f(x) \ = \ 7x^5 + 2x^4 + 4x^3 - 8x^2 + 3x - 6$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$-7x^5 + 2x^4 - 4x^3 - 8x^2 - 3x - 6$
$-f(-x)$	$7x^5 - 2x^4 + 4x^3 + 8x^2 + 3x + 6$
$-f(x)$	$-7x^5 - 2x^4 - 4x^3 + 8x^2 - 3x + 6$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	2	9	7
2	4	7	3
3	3	5	1
4	7	6	4
5	6	1	9
6	8	8	2
7	5	3	8
8	9	2	5
9	1	4	6

3. Evaluate $g(8)$.

$$g(8) = 2$$

4. Evaluate $f^{-1}(5)$.

$$f^{-1}(5) = 7$$

5. Assuming f is an **even** function, evaluate $f(-1)$.

If function f is even, then

$$f(-1) = 2$$

6. Assuming h is an **odd** function, evaluate $h(-6)$.

If function h is odd, then

$$h(-6) = -2$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \ = \ -x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \ = \ -(-x)^3 + (-x)$$
$$p(-x) \ = \ x^3 - x$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \ = \ -\left(x^3 - x\right)$$
$$-p(-x) \ = \ -x^3 + x$$

   c. Is polynomial p even, odd, or neither?

   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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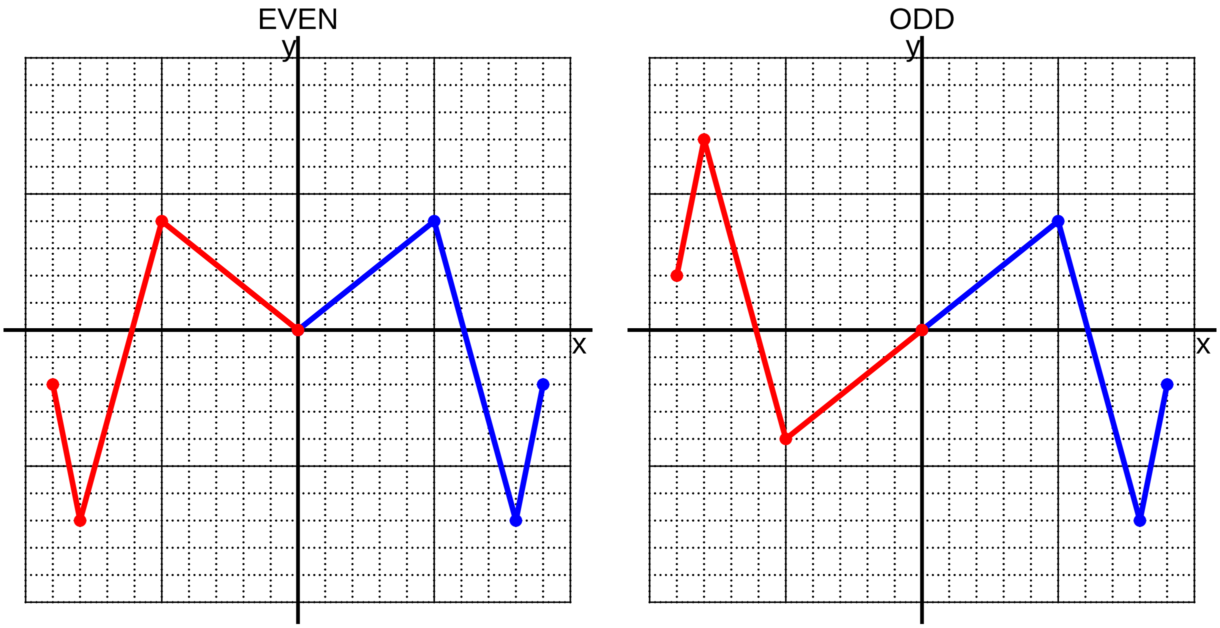
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x+8}{3}$$

a. Evaluate $f(76)$.

step 1: add 8
step 2: divide by 3

$$f(76) = \frac{(76)+8}{3}$$
$$f(76) = 28$$

b. Evaluate $f^{-1}(18)$.

step 1: multiply by 3
step 2: subtract 8

$$f^{-1}(x) = 3x - 8$$
$$f^{-1}(18) = 3(18) - 8$$
$$f^{-1}(18) = 46$$

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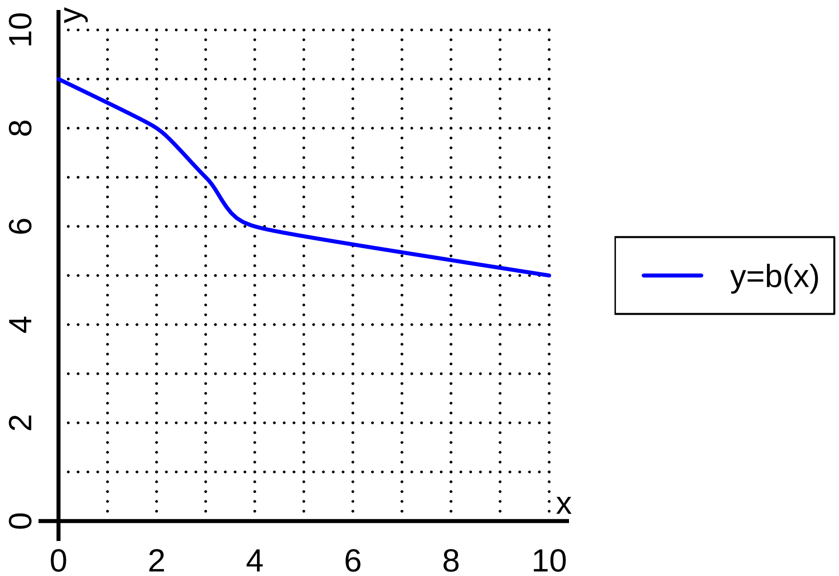
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$$b(2) \;=\; 8$$

b. Evaluate $b^{-1}(6)$.

$$b^{-1}(6) \;=\; 4$$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-4	4	-4	4
-1	6	-6	6	-6
0	0	0	0	0
1	6	-6	6	-6
2	-4	4	-4	4

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.